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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,602	10/13/2003	Sung-Fei Wang	10233-US-PA	2601
31561	7590	06/01/2005	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE 7 FLOOR-1, NO. 100 ROOSEVELT ROAD, SECTION 2 TAIPEI, 100 TAIWAN			CHAN, SING P	
			ART UNIT	PAPER NUMBER
			1734	
DATE MAILED: 06/01/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/605,602	Applicant(s) WANG, SUNG-FEI	
	Examiner Sing P. Chan	Art Unit 1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6 and 8 is/are rejected.
- 7) ☒ Claim(s) 2-4 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of group I, claims 1-8 in the reply filed on March 17, 2005 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol (U.S. 5,909,056) in view of Edwards et al (U.S. 5,881,945).

Regarding claim 1, Mertol discloses a bonding a heat sink to a semiconductor die package. The method includes providing a semiconductor die on a package substrate, attaching a dam ring or stiffener ring to the top surface of the substrate, (Col 4, lines 5-14) providing a heat sink, providing a curable epoxy adhesive or tape between the stiffener ring and the substrate surface and the protrusion of the heat sink, which corresponded to position of the die on the substrate and stiffener ring, and curing the adhesive after the heat spreader or heat sink is clamped to the package. (Col 4, lines 15-25 and Col 4, lines 39-55) Mertol does not disclose a plurality of second protruding sections located at positions corresponding to the stiffener ring. However, providing second protruding sections located at positions corresponding to the stiffener ring is well known and conventional as shown for example by Edwards et al. Edwards et al

Art Unit: 1734

discloses a sealing cap with sections of extension, i.e. protrusions, attached to a cap sealant or solder seal, i.e. stiffener ring. (Col 5, lines 20-23, Col 5, lines 55-58 and Figure 1)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a plurality of protruding sections corresponding to the position of the stiffener ring as disclosed by Edwards et al in the method of Mertol to provide a way to maintain hermetic seal reliability, decrease cost and improve package thermal performance. (See Edwards et al, Col 2, lines 57-61)

Regarding claim 5, Mertol as modified above is silent as to the heat sink is formed of copper. However, forming a cap, which is a heat sink, of copper is well known and conventional as shown for example by Edwards et al. Edwards et al discloses the cap or heat sink is formed of copper. (Col 5, lines 28-33)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the cap or heat sink as copper as disclosed by Edwards et al in the method of Mertol to provide a way to maintain hermetic seal reliability, decrease cost and improve package thermal performance. (See Edwards et al, Col 2, lines 57-61)

Regarding claim 6, Mertol discloses the protrusion corresponding to the position of the die is an integral unit with the heat sink. (Col 3, lines 24-28 and Figures 1A-4A and 4C) Mertol as modified above is silent as to the second protruding sections are an integral unit of the heat sink. However, forming the second protruding sections as an integral unit of the heat sink is well known and conventional as shown for example by

Art Unit: 1734

Edwards et al. Edwards et al shows the protruding sections corresponding to the stiffener ring on the cap or heat sink are an integral unit of the cap or heat sink. (Figure 1)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the protruding sections corresponding to the stiffener ring on the cap or heat sink as an integral unit of the cap or heat sink as disclosed by Edwards et al in the method of Mertol to provide a way to maintain hermetic seal reliability, decrease cost and improve package thermal performance. (See Edwards et al, Col 2, lines 57-61)

Regarding claim 7, Mertol as modified above is silent as to the sum of all the second protruding sections is less than the area of the stiffener ring. However, providing second protruding sections with sum of all the area is less than the stiffener ring is well known and conventional as shown for example by Edwards et al. Edwards et al discloses the stiffener ring with a larger lower picture-frame area. (Col 5, lines 59-65 and Figure 1)

Allowable Subject Matter

4. Claims 2-4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The claims recite a method of attaching a heat sink with a first protrusion corresponding to the chip location and a plurality of second protruding sections located

Art Unit: 1734

at a position corresponding to a stiffener ring to a chip package structure with a chip and stiffener ring. The method includes providing a gluing tape, cutting a pattern in the shape of the first and second protrusions on the gluing tape, aligning the first and second protrusions of the heat sink with cut pattern, disposing the heat sink onto the gluing tape, detaching the sink from the gluing tape so that a portion of the gluing tape remains adhered to the first and second protrusions to form the gluing layer, and bonding the heat sink to the chip package structure so that the first protrusion is attached to the chip and the second protrusions are attached to the stiffener ring.

Mertol discloses a bonding a heat sink to a semiconductor die package. The method includes providing a semiconductor die on a package substrate, attaching a dam ring or stiffener ring to the top surface of the substrate, (Col 4, lines 5-14) providing a heat sink, providing a curable epoxy adhesive or tape between the stiffener ring and the substrate surface and the protrusion of the heat sink, which corresponded to position of the die on the substrate and stiffener ring, and curing the adhesive after the heat spreader or heat sink is clamped to the package. (Col 4, lines 15-25 and Col 4, lines 39-55) Mertol does not disclose a plurality of second protruding sections located at positions corresponding to the stiffener ring and cutting a pattern in the shape of the first and second protrusions on the tape, aligning the first and second protrusions of the heat sink with cut pattern, disposing the heat sink onto the gluing tape, detaching the sink from the gluing tape so that a portion of the gluing tape remains adhered to the first and second protrusions to form the gluing layer, and bonding the heat sink to the chip package structure so that the first protrusion is attached to the chip and the second protrusions are attached to the

Art Unit: 1734

stiffener ring. Edwards et al discloses a sealing cap with sections of extension, i.e. protrusions, attached to a cap sealant or solder seal, i.e. stiffener ring. (Col 5, lines 20-23, Col 5, lines 55-58 and Figure 1) Edwards et al does not disclose providing a gluing tape, cutting a pattern in the shape of the first and second protrusions on the gluing tape, aligning the first and second protrusions of the heat sink with cut pattern, disposing the heat sink onto the gluing tape, detaching the sink from the gluing tape so that a portion of the gluing tape remains adhered to the first and second protrusions to form the gluing layer, and bonding the heat sink to the chip package structure so that the first protrusion is attached to the chip and the second protrusions are attached to the stiffener ring.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sing P. Chan whose telephone number is 571-272-1225. The examiner can normally be reached on Monday-Friday 7:30AM-11:00AM and 12:00PM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher A. Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1734

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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